

MSc subject in bird ecology

Spatial community composition of passerine birds in relation to climatic variation and insect prey abundance in sub-arctic birch forest

Background and general research issue

Climate variation affects spring arrival times and egg-laying dates of many bird species in northern areas. Similarly, climate is also important for the distribution and seasonal abundance of insect prey. Different response to climate variation across trophic levels may lead to a mismatch in arrival times of birds in relation to seasonal availability of insect prey. This could have important fitness effects for bird species that otherwise might show increased reproductive success and abundance in years of high availability of insect prey.

In order to understand the impact of climate variation on the relationship between birds and their insect prey, it is important to study the *spatial relationship* between predator and prey along climatic gradients. This has never been done concerning birds and insects in sub-arctic birch forest, where leaf-eating geometrid larvae are the main prey species. The number of geometrid larvae and their timing of development show strong spatial variation over short distances along climatic gradients. This may or may not be the case for bird species that depend on these insects as food. The MSc project outlined below will investigate the spatial relationship between the abundance of different bird species and the number of geometrid larvae along altitudinal (climatic) gradients in which the air temperature steadily decreases with increasing altitude.

Study area

We have three study regions, each with 10 altitudinal transects. One at the island of Reinøya (approx. 70 km from Tromsø), one at Skogsfjord (also about 70 km from Tromsø) and one at Storelva (just outside Tromsø). All transects have stations for observations and data collection at 30, 100, 170 and 240 meters above sea level, each supplied with two nest boxes for birds. Detailed studies of pied flycatchers (*Ficedula hypoleuca*) are already running in all three altitudinal gradients. Detailed monitoring of the abundance of geometrid larvae as a potentially food source is also in place. The candidate will therefore have a unique background material to work with in addition to field data collected during the present study.

The sub-research issue and methods of the MSc project is as following:

Main research issue:

Does the number of species and proportional abundance between bird species change according to spatial variation in moth abundance and phenology?

Methods:

Point-transect-estimation of occurrence and abundance of all passerine birds at all stations along the altitudinal gradient. This project requires good knowledge of bird songs.

Additional methods

- Registration of birch bud burst phenology along the altitudinal gradient
- Collection of moth larvae for determination of moth phenology (i.e. instar structure)
- Density measurements of moth larvae along the altitudinal gradient
- Logging of temperatures at all altitudes in all areas.

Start and field period

Preferred starting date is April/May 2010. Preference will be given to students willing to complete two field seasons (2010 and 2011). The students will receive field assistant salary during one of the seasons.

Supervisors:

The supervising team consists of researchers from the University of Tromsø and the Norwegian Institute for Nature Research (NINA): Rolf A. Ims (UiT professor), Jane U. Jepsen (NINA researcher), Tino Schott (PhD student) and Lauri Kapari (UiT research assistant). For international candidates an additional supervisor can be appointed from the student's home university. The project is supported by the Norwegian Research Council.